REMARKS

In the Office Action, dated March 4, 2009, the Examiner states that Claims 1, 5-8, 10-13, 15-19, 21-24 and 30-38 are pending and rejected. By the present Amendment, Applicant amends the claims.

Rejections under 35 U.S.C. §112

Claims 1, 5-8, 10-13, 15-19, 21-24 and 30-38 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite.

Specifically, it is requested that the term "coumalin" be amended to read "coumarin," and the term "ketocoumalin" to read "ketocoumarin." Moreover, it is requested that the term "fluorine-contained" be amended to read "fluorine-containing," and the term "fluorine skeleton-contained" to read "fluorine skeleton-containing." Applicant indicates that the foregoing amendments have been executed in the currently pending claims. Accordingly, Applicant respectfully requests withdrawal of the present rejection of Claims 1, 5-8, 10-13, 15-19, 21-24 and 30-38 under 35 U.S.C. §112, second paragraph.

Rejections under 35 U.S.C. §103(a)

Claims 32-34 and 37-38 are rejected under 35 U.S.C. §103(a) as being unpatentable over Sugawara et al. (JP 05-273899) in view of Toba et al. (JP 06-175554). Claims 18, 19 and 21-24 are rejected under 35 U.S.C. §103(a) as being unpatentable over Sugawara et al. in view of Morii et al. (US 6,066,378). Claims 32-38 are rejected under 35 U.S.C. §103(a) as being unpatentable over Sugawara et al. in view of Toba et al. and Ito et al. (JP 08-016077). Claims 1, 5, 7, 8, 10-12, 15-17 and 30-31 are rejected under 35 U.S.C. §103(a) as being unpatentable over Kashiwagi et al. (JP 03-123715) in view of Toda et al. (JP 06-130879). Claims 1, 5-8, 10-12, 15-17 and 30 are rejected under 35 U.S.C. §103(a) as being unpatentable over Kawabata et al. (US 5,453,340) in view of Kashiwagi et al. Claims 1, 5-8, 10-13, 15-17 and 30 are rejected under 35 U.S.C. §103(a) as being unpatentable over Kawabata et al. in view of Kashiwagi et al. and Morii et al. Applicant respectfully disagrees with and traverses these rejections.

In Kashiwagi et al., fluorinated epoxide corresponding to formula (7) in Examples of the present application is merely used as a minor component, that is, as a diluent of other fluorinated epoxide being an essential component. In contrast to Kashiwagi et al., the composition of currently amended Claim 1 contains, as the

fluorine-containing photoreactive compound, the only fluorine-containing photoreactive compound represented by the formula (1). Also, the effect of the present invention, wherein superior sensitivity and high refractive index modulation can be obtained without damaging the transparency by selecting only the fluorine-containing photoreactive compound represented by formula (1) as the fluorine-containing photoreactive compound, cannot be achieved from Kashiwagi et al. alone, or in combination with Kawabata et al. or Toba et al.

Fluorine-containing compounds are conventionally expected as materials for making a refractive index modulation large. However, the compounds were poor in compatibility with other blend components such as a binder resin described in Comparative examples 3 and 4 of the present invention, the film got clouded, and the blend ratio of the compounds could not be made high. Therefore, the refractive index modulation could not be made large in holograms (see paragraph [0010] in JP2002-204797, and Comparative examples 3 and 4 in JP2002-204797).

On the contrary, in the present invention, only the fluorine-containing photoreactive compound represented by formula (1) is selected as the fluorine-containing photoreactive compound. Since the fluorine-containing photoreactive compound represented by the formula (1) is high in compatibility with other blend components such as a binder resin, the containing ratio can be increased without damaging the transparency of the film of the composition. Since the fluorine-containing photoreactive compound represented by the formula (1) is a bifunctional monomer and its polymerization reactivity is high, it is not necessary to add a large amount of other polyfunctional acrylate. Also, the fluorine-containing photoreactive compound represented by the formula (1) is superior in diffusing/moving ability at the time of interference exposure since it has a specific straight-chain structure. From these superior features, superior sensitivity and high refractive index modulation can be obtained without damaging the transparency of the photosensitive of the photosensitive composition of the present invention.

The refractive index modulation of Examples in Kawabata et al. is 0.0050 to 0.0089, which is largely low to the extent of Comparative examples of the present application. In Kawabata et al., fluorinated epoxy is exemplified as the cationic photopolymerizable compound and the effects of poor compatibility and cloudiness are not suggested. In Toba et al., the problem that the fluorine-containing

photoreactive compound is poor in compatibility and gets clouded is also not suggested.

On the other hand, the composition of Kashiwagi et al. is a coating composition for denture and denture base for seeking plaque resistance or the like in fluorinated epoxy. In Kashiwagi et al., the main component of fluorinated epoxy is a compound represented by general formula [I] and many kinds of fluorine-containing photoreactive compounds having other structures are also disclosed. Applicant respectfully asserts that this reference teaches away from selecting only HDEP without using the compounds represented by general formula [I]. It is not clear from Kashiwagi et al. what kind of fluorine-containing compound will provide a very low refractive index and whether it is suitable for a low refractive index type refractive index modulating component, due to having superior properties such as superior compatibility with other blend components (e.g. a binder resin), polymerization reactivity and diffusing/moving ability at the time of hologram-exposure.

Further, an oxetanyl group as in Claim 6 is not disclosed in any of cited documents. Oxirane disclosed in Kawabata et al. is a cyclic ether having a three-membered ring.

For Claims 10 and 30, Applicant respectfully asserts that the prior art is silent with respect to an organic-inorgainc hybrid polymer used as a binder resin. Also, Applicant respectfully asserts that the cited prior art does not teach or suggest that a fluorine skeleton-containing radical photopolymerizable compound is used in combination with the fluorine-containing photosensitive compound represented by the formula (1).

With respect to new Claim 39, Applicant indicates that it is supported by paragraph [0063] and Examples 3, 4 and 5 in JP2002-204797. In Examples 3, 4 and 5, Polyethylene glycol diacrylate is corresponding to a binder resin having an ethylenically unsaturated bond capable of causing additional polymerization.

The composition of Claim 39 contains a binder resin having an ethylenically unsaturated bond capable of causing additional polymerization besides a fluorine-containing photoreactive compound. Therefore, when the hologram recording material layer is subjected to interference exposure, the fluorine-containing photoreactive compounds in intensely exposed regions are polymerized not only with other fluorine-containing photoreactive compounds being adjacent but also with the

surrounding binder resin, and reactivity accordingly becomes high, thereby improving the sensitivity at the time of the interference exposure and the refractive index modulation. In this case, if ordinary exposing or heating over the entire surface is carried out after the interference exposure, the variation in the refractive index is promoted and the polymerization reaction is completed to form a hologram, and further the formation of the covalent bond between the binder resin and the fluorine-containing photoreactive compound is further advanced so as to provide an advantageous effect that superior layer physical properties such as layer strength and heat resistance is give to the hologram recording material layer (paragraph [0064] in JP2002-2047907). Also, Claim 39 contains a cationic photopolymerizable compound containing fluorine skeleton having a high refractive index. If the fluorine-containing photoreactive compound and the binder resin are capable of reacting in the presence of a fluorene skeleton-containing cationic photopolymerizable compound having a high refractive index, a fluorine-containing photoreactive compound having a low refractive index and a binder resin having a middle refractive index between high and low, a binder resin which exists around a cationic photopolymerizable compound containing a fluorene skeleton having a high refractive index can be easily moved to the side of a fluorine-containing photoreactive compound and the binder resin is unevenly present. Therefore, the difference of refractive index is easily exhibited.

Claim 43 is supported by Example 13 in JP2002-204797. The composition of Claim 43 contains metal fine particles having a refractive index different from that of the fluorine-containing photoreactive compound represented by formula (1) and having an ethylenically unsaturated bond. Therefore, when the composition is subjected to hologram-exposure, it is localized in the intensely exposed region or the weakly-exposed region of a volume hologram recording material layer and polymerized by the difference in photoreactivity between the fluorine-containing photoreactive compound and the metal fine particle. Thereby, the difference in refractive index is generated.

In light of the foregoing response, all the outstanding objections and rejections are considered overcome. Applicant respectfully submits that this application should now be in condition for allowance and respectfully requests favorable consideration.

Respectfully submitted,

August 4, 2009
Date

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